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THE ARMY-WORM

By W. P. FLINT



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THE ARMY-WORM*

BY W. P. FLINT, ENTOMOLOGIST,
STATE NATURAL HISTORY SURVEY, URBANA, ILL.

The army-worm is one of the most destructive of the insect pests of the cereal crops and forage grasses, but its injuries may be promptly arrested, and in many cases almost completely prevented, by simple measures easily applied by any farmer. This insect belongs to the great family of moths which includes all of our common cutworms, and it occurs throughout the state each year. Ever since Illinois was first settled there have been, at irregular intervals, more or less general outbreaks of the army-worm covering, one season, from four to five counties, and another, nearly the entire state, and there is seldom a year during which it does not become destructively abundant in some Illinois locality. These outbreaks are usually confined to small or comparatively restricted areas, here and there, ranging in size from a few acres up to several thousand. As a rule, there is a period of at least five or six years between local outbreaks.

SEASONAL HISTORY

The winter is passed in the partly grown, worm or larval stage, the worms being buried in the ground or well hidden and protected in thick matted grass. There is a slight possibility that a few of the insects may overwinter in the pupal or resting stage. The worms become full-grown very early in spring—by the middle of March or the first of April in the southern part of the state, and from the middle to the last of April in central Illinois—enter the ground to a depth of about two inches, and there change to brown pupae, the resting stage, in which they do not eat, or move except for a slight wiggling of the tip of the abdomen. The worms remain in the pupal stage from two to four weeks, the exact time depending on the temperature, and emerge as fawn-colored moths.

GENERAL APPEARANCE OF THE MOTH

The front wings of the moth have a few irregular dark markings, and a small white dot near the center. The hind wings are a little lighter than the front wings, show a few more irregular dark lines and markings, and lack the central white dot. When the wings are folded, the moth is about 1 to 1 $\frac{1}{4}$ inches long, and about $\frac{3}{4}$ inch across the ends of the wings.

*Known scientifically as *Cirphis unipuncta*.

HABITS OF THE MOTH

The moths fly mostly during the night, hiding by day under rubbish and trash in the fields. They are only slightly attracted by lights, but very strongly attracted by the odor of decaying fruits or of sweets. They are strong fliers, and with a moderate wind behind them they travel a number of miles. For depositing their eggs they generally seek a place where the vegetation is dense and the grasses are closely matted together, frequently laying them in the rank growth around old straw-stacks or in fields of oats, wheat, or rye where growth has been very vigorous and the grain has lodged. They

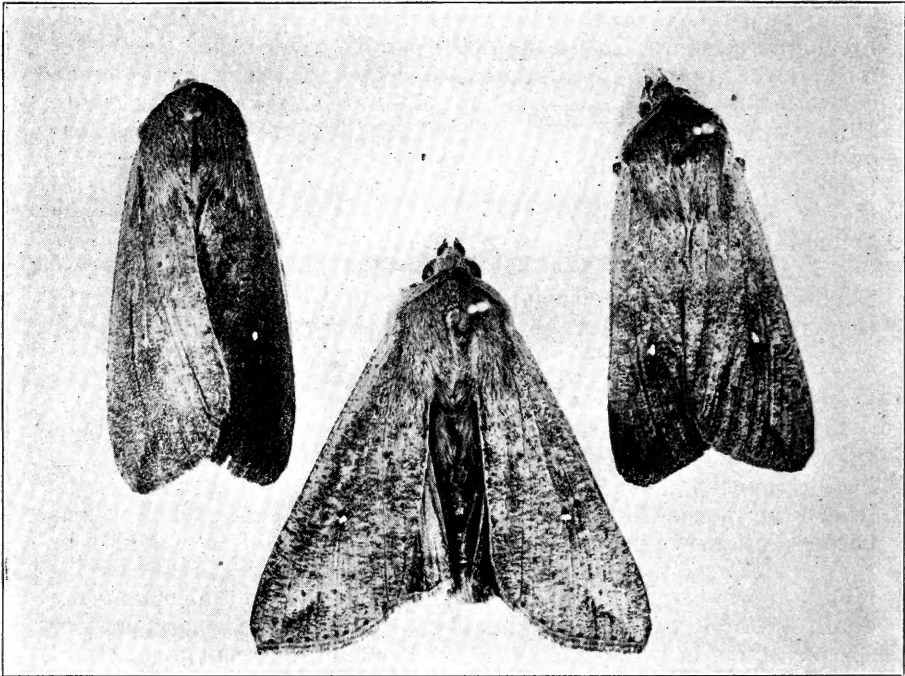


FIG. 1. Army-worm moths showing position of the white dot on front wings. (Twice natural size.)

also frequently lay their eggs in the rank-growing grass of timothy meadows, blue-grass pastures, or orchards. The eggs are deposited under the sheaths of the leaves and around the bases of various grasses, from 25 to 100 or more in a place. As the moths are very prolific—a single female laying from 500 to 800 eggs—and somewhat gregarious, enormous numbers of eggs may be laid in a small area. The worms hatching from these eggs very soon exhaust the limited food supply at hand and move out in large numbers or armies to search for fresh food plants. It is this migration that has given the insect the popular name of army-worm.

GENERAL APPEARANCE OF THE WORM

Ten days or two weeks after egg-laying small colorless worms with dark heads hatch from the eggs. They have the looping habit of the measuring-worms, but remain closely hidden by day about the roots of grasses, feeding at night and growing rather slowly for the first ten days or two weeks. At the end of this time they begin to feed more ravenously and to grow rapidly, becoming full-grown in

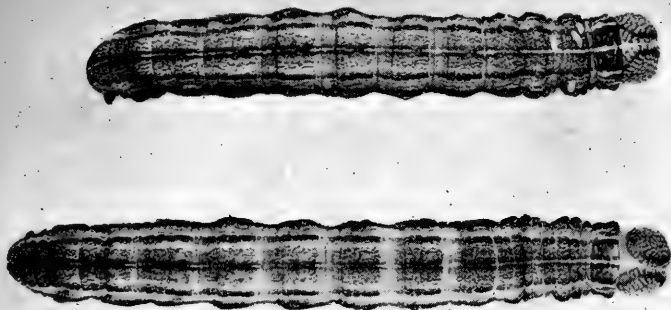


FIG. 2. Full-grown army-worm, the lower one showing eggs of tachinid fly attached to back. (Twice natural size.)

from three to four weeks, and are then from $1\frac{1}{2}$ to 2 inches long. They are gray or blackish, with a narrow, broken whitish stripe down the center of the back. There are three stripes of nearly equal width on each side, the lower stripe being light yellow with whitish edges, the middle one dark, with a somewhat lighter center, and the upper one a little darker than the lower, but with narrow white lines along its edge. When full-grown they enter the ground, change to the resting or pupal stage, and emerge as moths in about twenty days.

NUMBER OF GENERATIONS AND TIME OF THEIR APPEARANCE

There are three generations of this insect each year in the southern two-thirds of the state, and probably throughout Illinois.

In southern Illinois moths of the first generation usually make their appearance about March 20, in central Illinois about April 1, and in the extreme northern end of the state about April 10; but the dates vary greatly in different seasons, being earliest, as might be expected, when an early spring follows a mild winter. As a rule, worms of the first generation do the greatest damage. They may be looked for in the southern end of the state from May 20 to May 30; in the central part of the state from June 1 to 15; and in the northern end of the state from June 15 to 30. The second generation of the worms rarely appears in sufficient numbers to do damage in this



FIG. 3. Pupae or resting stage. This stage is passed wholly in the ground. (Twice natural size.)

state, although there have been a few local outbreaks the last of July and in August. The third generation is a little more likely than the second to be abundant. When it is, it generally occurs from the first to the middle of September.

FOOD PLANTS

The larvae prefer the grasses, and in this state have been found feeding upon practically all the wild grasses, and on blue-grass, timothy, corn, rye, oats, barley, millet, wheat, and sorghum, all belonging to the great family of grasses. They will at times feed on legumes, such as clover and alfalfa, but they greatly prefer the

grasses and generally do not damage legumes unless the grasses are scarce. The greater damage done by the worms is by eating the leaves and blades of corn, oats, and other small grains. If they are abundant early enough in the season, they will eat the heads of wheat, rye, and barley, but if they do not appear until the wheat heads are fairly well matured, very little of the grain is injured.

During nearly every army-worm outbreak there is also an abundance of the variegated cutworm.* This pest will be found in the same situations as the army-worm and associated with it. It feeds readily upon clover and alfalfa, and often causes considerable of the injury to these plants which is attributed to the army-worm.

NATURAL ENEMIES

Owing to the fact that the army-worm is preyed upon by a large number of insect parasites and predacious enemies which become



FIG. 4. Corn field, Platt county, June, 1919. About ten acres of corn, twenty inches high, has been completely eaten by the worms.

very abundant during excessive outbreaks and greatly reduce the numbers of the worms, the generation succeeding an outbreak is not abundant enough to cause any damage. In fact we do not have a single record in this state of damage by more than one brood during any one season, and outbreaks rarely occur in the same locality in consecutive years. One of the most abundant of the insect enemies of the army-worm is a grayish fly, a little larger than the house-fly, which deposits its eggs on the front third of the worm's body. The

**Peridroma margaritosa*.

maggots which hatch from these eggs feed on the body contents of the worm, and always kill it before it reaches the moth stage. Sometimes these eggs are mistaken for those of the army-worm, but it should go without saying that the army-worm deposits eggs only when it is in the full-grown or moth stage.

CONTROL MEASURES

The most effective means of controlling an outbreak is by poisoning the worms in the fields where it originated or around the margins of such fields as the worms are leaving. This can best be done by the use of a bait made as follows:

25 lbs. dry bran
1 lb. white arsenic
or
1 lb. Paris green

Mix dry. Add water (about 3 gallons) to make a stiff mash, in which has been stirred 2 quarts of cheap molasses, black strap preferred. The mash should be of such consistency that it will just hold together when tightly squeezed in the hand. If possible to obtain it, white arsenic should be used instead of Paris green, as it can be bought for about one fifth the price and is just as effective for baits of this sort.* The bait should be sown broadcast over the infested field at the rate of 8 or 10 pounds to the acre. This is about as thickly as one can scatter this quantity and have it cover the ground. The mixture will be much more effective if put on in this way than if thrown out in lumps or placed in lines or ridges over the fields. The application should be made during the latter part of the afternoon or early in the evening, as the worms do the greater part of their feeding at night, and the bait is much more attractive when fresh. This mash has been used successfully in a number of states and in hundreds of instances in this state, and when properly mixed and correctly applied it has never been known to fail in killing from 60 to 90 per cent. of the worms in the fields.

It is not advisable to use this bait in the vicinity of buildings, where chickens will have access to it. It may, however, be sown in pastures if it is applied thinly over the entire area at the rate recommended in this circular, and not put out in lumps or lines.

Another method for controlling the army-worm is to surround fields or areas in which it is abundant by ditches, in which a log should be dragged until a layer of fine dust is formed, the worms being trapped and killed in post-holes dug in the bottoms of these ditches. Such ditches are best constructed by plowing a deep dead-furrow, and then dragging a heavy log back and forth a number of times, until the sides of the furrow are pulverized to a fine dust. After this, the post-holes should be dug at intervals of about one rod

*White arsenic can not be used in sprays which are applied to the foliage of plants, as it has a very caustic effect on leaf-surfaces.

along the bottoms of the furrows. If a large number of worms are attempting to cross such a furrow, their continued attempt to climb the sides will, after a time, wear down the dust, making it necessary to use the drag and clean out the post-holes each day that the barrier is maintained. The worms move out of the field where the outbreaks have originated as soon as their food supply is exhausted. This movement generally begins in the latter part of the afternoon and continues during the night, which makes it necessary to have the dusty furrows in good condition each evening. The worms may be killed in the post-holes or the bottom of the furrow by sprinkling lightly with kerosene or with a 20% kerosene emulsion. Those that have accumulated in the furrows may be killed by scattering liberal quantities of the poisoned bran mash among them.

It is highly important to use the bait as soon as the worms are detected in large numbers, as they will feed upon it as readily when small as when nearly full-grown, and if they are detected and the bait applied before they reach the half-grown stage, nearly all damage from them may be avoided.

Tar-line barriers, such as are used against the chinch-bug, have not proved very effective in controlling the army-worm.

If one will learn to recognize the army-worm moth, this will aid greatly in foretelling outbreaks of this insect. When moths are abundant, the worms may be expected to appear about three weeks later, and a close watch should be kept of all places on the farm where the moths are most likely to lay their eggs.



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